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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/936,041	12/18/2001	Ichio Yudasaka	110553	7809

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EXAMINER

ROMAN, ANGEL

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 01/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.



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11

DATE MAILED:

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**Commissioner of Patents and Trademarks**

During a telephone conversation with Kim Wilson on December 19, 2002, it was agreed to restart the time period for reply and the submission of new copies of the previous Office Action mailed on November 21, 2002 since Applicant claimed the previous Office Action was not received.

  
**John F. Niebling**  
Supervisory Patent Examiner  
Technology Center 2800

# Office Action Summary

Application No.

09/936,041

Applicant(s)

YUDASAKA ET AL.

Examiner

Angel Roman

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 03 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 16-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: *Letter*.

### **DETAILED ACTION**

Note: During a telephone conversation with Kim Wilson on December 19, 2002, it was agreed to restart the time period for reply and the submission of new copies of the previous Office Action mailed on November 21, 2002 since Applicant claimed the previous Office Action was not received.

#### ***Election/Restrictions***

1. Newly submitted claims 16-24 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claims 16-24 are directed to a thin film transistor device, while the original invention is drawn to a method for manufacturing a display device, the original invention method could be used to manufacture a different and patentable distinct semiconductor device from the device claimed in the newly submitted claims.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 16-24 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3-5, 7, 8 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by van der Have U.S. Patent 5,008,723.

van der Have discloses a method of manufacturing a thin film transistor, comprising; forming a channel region facing a gate electrode 3' through a gate insulating film 5'; forming source 2' and drain 1' regions connected through the channel region in a crystalline semiconductor film 9' that is formed on a surface of an insulating substrate 11'; and forming a recombination center 14' by introducing an impurity into the channel region so that a distance between the recombination center and the drain region 1' is shorter than a distance between the recombination center and the source region 2' (see figure 9). The impurity is introduced into said channel region by injecting the impurity from a surface side of said channel region (see column 5, lines 63-68) before forming the gate electrode 3' (see column 4, lines 44-54). An average projected range of the impurity in said process of introducing an impurity is from a center in a direction of thickness of said channel region to an interface between the channel region and the gate insulating film (see figure 9).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 2, 6, 9-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over van der Have U.S. Patent 5,008,723.

van der Have is applied as above but lacks anticipation on describing the impurity being at least one kind selected from the group including inert gases, metals, Group III elements, Group IV elements and Group V elements; introducing said impurity

into said channel region after said gate insulating film and said gate electrode are sequentially formed on an surface side of said channel region; introducing said impurity to said channel region being by impurity diffusion from an impurity diffusion source arranged at a lower layer side of said channel region in a crystallization process on a semiconductor film; said crystallization process being laser annealing; each process carried out after introducing said impurities to said channel region being carried out at a temperature below 300°C; and disclosing a distance from the recombination center to the drain region and the distance from the recombination center to the source region in a range of 1/10 to 1/3 of the channel length.

With respect to describing the impurity being at least one kind selected from the group including inert gases, metals, Group III elements, Group IV elements and Group V elements, van der Have describes the impurity as being an n-type impurity, therefore it would have been obvious to a person having ordinary skills in the art at the time the invention was made to use an impurity being at least one kind selected from the group including inert gases, metals, Group III elements, Group IV elements and Group V elements in the primary reference of van der Have since conventional n-type impurities belong in these groups.

Regarding introducing said impurity into said channel region after said gate insulating film and said gate electrode are sequentially formed on an surface side of said channel region, introducing impurities after formation of gate insulator and gate is conventional in the art and it would have been obvious to one having ordinary skills in

the art at the time the invention was made to disclosed it in the primary reference of van der Have since van der Have is already suggesting introducing the impurities.

As to introducing said impurity to said channel region being by impurity diffusion from an impurity diffusion source arranged at a lower layer side of said channel region in a crystallization process on a semiconductor film, van der Have suggest using a diffusion process to introduce the impurity (see column 5, lines 63-65). In view of this disclosure, it would have been obvious to a person having ordinary skills in the art at the time the invention was made to introduce said impurity to said channel region by impurity diffusion from an impurity diffusion source arranged at a lower layer side of said channel region in a crystallization process on a semiconductor film in the primary reference of van der Have since diffusing an impurity by diffusing from an impurity diffusion source arranged at a lower layer side of a channel region during a crystallization process of a semiconductor film is an alternate conventional method of introducing an impurity, furthermore van der Have suggest using a diffusion process for introducing the impurity therefore selecting an optimum diffusion process would have been obvious to a person having ordinary skills in the art at the time the invention was made by performing routine experimentation based on a desire accuracy and manufacturing costs.

Regarding using a laser annealing in the recrystallization process, van der Have uses a crystalline layer 9' to form the transistor therefore it would have been obvious to a person having ordinary skills in the art at the time the invention was made to select an optimum crystallization method, i.e. laser annealing, to form the crystalline layer in the



primary reference of van der Have based on a desire accuracy and manufacturing costs and since forming crystalline layers by laser annealing is a widely used crystallizing conventional method.

With respect to processes temperatures after introducing said impurities to said channel region being less than 300 °C, selecting an optimum maximum temperature of less than 300 °C for subsequent processes in the primary reference of van der Have would have been obvious to a person having ordinary skills in the art at the time the invention was made since process temperatures of less than 300 °C are only considered to be an optimum process parameter, furthermore there is no indication of using process temperatures higher than 300 °C in subsequent processes in the primary reference of van der Have.

Regarding disclosing a distance from the recombination center to the drain region and the distance from the recombination center to the source region in a range of 1/10 to 1/3 of the channel length, it would have been obvious to a person having ordinary skills in the art at the time the invention was made to describe the recombination center distances in a range of 1/10 to 1/3 of the channel length in the primary reference of van der Have since it would accurately describe the recombination center distances as appreciated in figure 9.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Houston et al., Ha, Gardner et al. and Ota disclose methods for manufacturing thin film transistors having recombination centers for capturing carriers located at a distance closer to a drain region than a distance from a source region. Vu et al. and Takenuchi disclosed methods for forming thin film transistors having recombination centers at a distance closer to a source region than a distance from a drain region.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angel Roman whose telephone number is (703) 306-0207. The examiner can normally be reached on Monday-Friday 8:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (703) 308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

AR  
January 6, 2003

  
John F. Niebling  
Supervisory Patent Examiner  
Technology Center 2800